

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-3. (Canceled)

Claim 4. (New) A method for measuring a biodegradation rate of a non-natural organic compound in the presence of a biodegradation medium, comprising:

preparing a sample medium by adding the non-natural organic compound to the biodegradation medium and without enriching said sample medium with a radioactive carbon isotope  $^{14}\text{C}$ ;

measuring a concentration of  $^{14}\text{C}$  (pMC) of a control medium before biodegradation which is the biodegradation medium without said non-natural compound;

measuring a concentration of  $^{14}\text{C}$  (pMC), carbon, and metal as an internal standard of the sample medium before and after biodegradation;

calculating the biodegradation rate by using the obtained pMC values for the following calculation formulae:

$$B = \frac{\left( \text{pMC of control medium} \right) - \left( \text{pMC of sample medium} \right)}{\left( \text{pMC of control medium} \right)} \quad (1)$$

$$C = \frac{\left( \text{pMC of control medium} \right) - \left( \text{pMC of sample medium} \right)}{\left( \text{pMC of control medium} \right)} \quad (2)$$

wherein a carbon content in the sample medium before biodegradation (D) is

$$D = \frac{\text{Carbon content derived from sample (g)}}{B} \quad (3)$$

wherein a carbon content in sample medium after biodegradation (E) is

$$E = D - \text{Amount of carbon dioxide discharged from sample medium (g)} \times \frac{12}{44} \quad (4) \text{ and}$$

wherein a biodegradation rate is

$$\text{Biodegradation rate (\%)} = \left[ 1 - \frac{E \times C}{D \times B} \right] \times 100 \quad (5)$$

$$= \left[ 1 - \frac{E \times C}{\text{Carbon content derived from sample (g)}} \right] \times 100 \quad (6);$$

or

wherein said biodegradation rate is determined using the following calculation

formulae

$$H = \frac{F}{G} \times D \quad (7)$$

$$E = \frac{J}{I} \times K = \frac{J}{I} \times \frac{F}{G} \times D \quad (8)$$

wherein

F: metal concentration of sample medium before biodegradation;

G: carbon concentration of sample medium before biodegradation;

I: metal concentration of sample medium after biodegradation;

J: carbon concentration of sample medium after biodegradation;

D: carbon content (g) of sample medium before biodegradation;

E: carbon content (g) of sample medium after biodegradation;

H: metal content (g) of sample medium before biodegradation;

K: metal content (g) of sample medium after biodegradation; and  $K = H$ .

Claim 5. (New) The method according to claim 4, wherein said metal is selected from the group consisting of iron, copper, manganese and mixtures thereof.

Claim 6. (New) The method according to claim 4, wherein the non-natural organic compound is a petrochemical and/or coal chemical selected from the group consisting of compounds synthesized from raw materials of fossil fuel.

Claim 7. (New) The method according to claim 6, wherein the fossil fuel is petroleum, coal or natural gas.

Claim 8. (New) The method according to claim 4, wherein the non-natural organic compound is a synthetic detergent.

Claim 9. (New) The method according to claim 4, wherein the non-natural organic compound comprises no radioactive carbon isotope  $^{14}\text{C}$  which already decayed.

Claim 10. (New) The method according to claim 4, wherein the content of a radioactive carbon isotope  $^{14}\text{C}$  is measured by using a scintillation counter or an accelerator-mass spectrometer.

Claim 11. (New) The method according to claim 4, wherein a total content of the metal does not change before and after biodegradation.

Claim 12. (New) The method according to claim 4, wherein carbon dioxide generated in biodegradation is not trapped.

Claim 13. (New) The method according to claim 4, wherein the biodegradation is not carried out in a closed reaction tank.

Claim 14. (New) The method according to claim 4, wherein the biodegradation rate is measured with an apparatus in open atmosphere.

Claim 15. (New) The method according to claim 4, wherein the biodegradation rate is measured without providing measures against radiation.

Claim 16. (New) A method for measuring a biodegradation rate of a non-natural organic compound in the presence of a biodegradation medium, comprising:

mixing a non-natural organic compound and a natural substance containing a radioactive carbon isotope  $^{14}\text{C}$  having a function of causing biodegradation of said non-natural organic compound, to obtain a sample without enriching said sample with a radioactive carbon isotope  $^{14}\text{C}$ ;

charging said sample into a reaction tank of a biodegradation reaction apparatus;

carrying out a biodegradation reaction of said sample at a predetermined temperature and for a predetermined time while an air having carbon dioxide completely removed therefrom is introduced into a vicinity of a bottom of the reaction tank;

wherein said air is introduced into said reaction tank through a carbon dioxide absorption tank, to inhibit carbon dioxide from the atmosphere to enter into said reaction tank;

after completion of said biodegradation reaction, burning a medium containing said non-natural organic compound of the biodegraded sample, in air having carbon dioxide removed therefrom or in pure oxygen, to convert the medium into carbon dioxide;

passing said carbon dioxide through a carbon dioxide absorption tank, and absorbing and trapping said carbon dioxide in said carbon dioxide absorption tank;

measuring a content (pMC) of a radioactive carbon isotope  $^{14}\text{C}$  in said carbon dioxide; and further comprising:

determining pMC of said medium containing said sample obtained as described above before and after biodegradation;

determining pMC of a control medium of a radioactive carbon isotope  $^{14}\text{C}$  obtained in the same manner by using a medium containing a natural substance alone without addition of the non-natural organic compound; and

calculating the biodegradation rate by using the obtained pMC values for the following calculation formulae:

$$B = \frac{\left( \text{pMC of control medium} \right)_{\text{before biodegradation}} - \left( \text{pMC of sample medium} \right)_{\text{before biodegradation}}}{\left( \text{pMC of control medium} \right)_{\text{before biodegradation}}} \quad (1)$$

$$C = \frac{\left( \text{pMC of control medium} \right)_{\text{after biodegradation}} - \left( \text{pMC of sample medium} \right)_{\text{after biodegradation}}}{\left( \text{pMC of control medium} \right)_{\text{after biodegradation}}} \quad (2)$$

wherein the pMC of the control medium does not change before and after biodegradation;

wherein a carbon content in sample medium before biodegradation (D) is

$$D = \frac{\text{Carbon content derived from sample (g)}}{B} \quad (3)$$

wherein a carbon content in sample medium after biodegradation (E) is

$$E = D - \text{Amount of carbon dioxide discharged from sample medium (g)} \times \frac{12}{44} \quad (4) \text{ and}$$

wherein a biodegradation rate is

$$\text{Biodegradation rate (\%)} = \left[ 1 - \frac{E \times C}{D \times B} \right] \times 100 \quad (5)$$

$$= \left[ 1 - \frac{E \times C}{\text{Carbon content derived from sample (g)}} \right] \times 100 \quad (6).$$

Claim 17. (New) The method according to claim 16, wherein said medium subjected to biodegradation comprises a metal as an internal standard which does not biodegrade;

wherein a total content of the metal is constant before and after the biodegradation operation; and

wherein a biodegradation rate is determined using the following calculation formulae

$$H = \frac{F}{G} \times D \quad (7)$$

$$E = \frac{J}{I} \times K = \frac{J}{I} \times \frac{F}{G} \times D \quad (8)$$

wherein

F: metal concentration of sample medium before biodegradation;

G: carbon concentration of sample medium before biodegradation;

I: metal concentration of sample medium after biodegradation;

J: carbon concentration of sample medium after biodegradation;

D: carbon content (g) of sample medium before biodegradation;

E: carbon content (g) of sample medium after biodegradation;

H: metal content (g) of sample medium before biodegradation;

K: metal content (g) of sample medium after biodegradation; and  $K = H$ .

Claim 18. (New) The method according to claim 4, wherein said biodegradation rate is calculated using formulae (1) -(6).

Claim 19. (New) The method according to claim 4, wherein said biodegradation rate is calculated using formulae (7) -(8).